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Fifth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Manufacturing Process – III

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions, selecting
at least TWO questions from each part.**

PART – A

- 1 a. Explain with neat sketches the classification of metal forming processes based on the force applied. (10 Marks)
- b. Differentiate between Hot working and Cold working processes. (05 Marks)
- c. Explain the concept of true stress and true strain. (05 Marks)
- 2 a. Explain the effect of various parameters a metal working process. (10 Marks)
- b. Comment on: (i) Deformation zone geometry (ii) Residual stresses in wrought products. (10 Marks)
- 3 a. Derive an expression for forging pressure and load in open die forging by slab analysis in sliding friction at the interface. State the assumptions made. (10 Marks)
- b. Determine the maximum and average die pressure for forging of a circular disc of 150 mm diameter and 100 mm thick between two flat dies having coefficient of friction 0.1. The yield strength of the disc material is equal to 230 N/mm². (05 Marks)
- c. Explain the various forging defects. (05 Marks)
- 4 a. Explain with neat sketches different types of rolling mill arrangements. (10 Marks)
- b. Briefly explain the phenomenon of the effect of back tension and front tension with respect to rolling load. (05 Marks)
- c. Calculate the bite angle when rolling a plate of 15 mm thick using work rolls of 400 mm diameter and reducing the thickness by 3 mm. (05 Marks)

PART – B

- 5 a. With a neat sketch, explain the different elements of a drawing die. (06 Marks)
- b. Starting from fundamentals derive an expression for drawing stress by slab analysis. (08 Marks)
- c. Write a note on estimation of redundant work in drawing. (06 Marks)
- 6 a. With neat sketches, explain briefly direct and indirect extrusion processes. (08 Marks)
- b. Explain clearly the variables influencing extrusion process. (06 Marks)
- c. Briefly explain the different defects associated with extrusion. (06 Marks)
- 7 a. Explain the different types of sheet metal forming methods. (08 Marks)
- b. Explain how circular washers are produced using a compand die. (06 Marks)
- c. Explain forming limit diagram. (06 Marks)
- 8 a. Explain the principle of working with neat sketches: (i) Explosive forming (10 Marks)
- (ii) Electrohydraulic forming.
- b. What is sintering? Explain its mechanism. (05 Marks)
- c. List the applications of powder metallurgy components. (05 Marks)

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